

# AVIATION

*The Oldest American Aeronautical Magazine*

AUGUST 11, 1924

Issued Weekly

PRICE 10 CENTS



The world's largest flying boat, the Titan, recently completed in England (two Napier Lion engines)

VOLUME  
XVII

## SPECIAL FEATURES

NUMBER  
6

LOENING AMPHIBIAN PLANES ORDERED  
A \$6,000,000 ERROR IN AIR SERVICE COSTS  
AEROMARINE MODEL EO SPORT FLYING BOAT  
THE 15TH ANNIVERSARY OF OUR AIR SERVICE

GARDNER PUBLISHING CO., Inc.  
HIGHLAND, N. Y.  
225 FOURTH AVENUE, NEW YORK

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**THREE-PLACE 150 H.P.**  
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 READY TO FLY AWAY

**Curtiss Metropolitan Airplane Company**  
 Port Washington - Long Island - New York

AUGUST 31, 1924

# AVIATION

VOL. XVII NO. 6

Published every Monday

## CONTENTS

Editorial: The Curtiss Seagull	557	J. H. Volkmann: Joan Currier Staff	565
The American Model EO Sport Flying Boat	558	Learning Amphibians: Placens O'Connell	566
The \$600,000 Error in Air Service Costs	561	The Modified Winchester Ball	567
Gold Flights	562	Light Planes and Gliders	567
The 15th Anniversary of Our Air Service	563	Airports and Airways	569
(Continued)	564	U. S. Air Forces	570

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1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 2681, 2682, 2683, 2684, 2685, 2686, 2687, 2688, 2689, 2690, 2691, 2692, 2693, 2694, 2695, 2696, 2697, 2698, 2699, 2700, 2701, 2702, 2703, 2704, 2705, 2706, 2707, 2708, 2709, 2710, 2711, 2712, 2713, 2714, 2715, 2716, 2717, 2718, 2719, 2720, 2721, 2722, 2723, 2724, 2725, 2726, 2727, 2728, 2729, 2730, 2731, 2732, 2733, 2734, 2735, 2736, 2737, 2738, 2739, 2740, 2741, 2742, 2743, 2744, 2745, 2746, 2747, 2748, 2749, 2750, 2751, 2752, 2753, 2754, 2755, 2756, 2757, 2758, 2759, 2760, 2761, 2762, 2763, 2764, 2765, 2766, 2767, 2768, 2769, 2770, 2771, 2772, 2773, 2774, 2775, 2776, 2777, 2778, 2779, 2780, 2781, 2782, 2783, 2784, 2785, 2786, 2787, 2788, 2789, 2790, 2791, 2792, 2793, 2794, 2795, 2796, 2797, 2798, 2799, 2800, 2801, 2802, 2803, 2804, 2805, 2806, 2807, 2808, 2809, 2810, 2811, 2812, 2813, 2814, 2815, 2816, 2817, 2818, 2819, 2820, 2821, 2822, 2823, 2824, 2825, 2826, 2827, 2828, 2829, 2830, 2831, 2832, 2833, 2834, 2835, 2836, 2837, 2838, 2839, 2840, 2841, 2842, 2843, 2844, 2845, 2846, 2847, 2848, 2849, 2850, 2851, 2852, 2853, 2854, 2855, 2856, 2857, 2858, 2859, 2860, 2861, 2862, 2863, 2864, 2865, 2866, 2867, 2868, 2869, 2870, 2871, 2872, 2873, 2874, 2875, 2876, 2877, 2878, 2879, 2880, 2881, 2882, 2883, 2884, 2885, 2886, 2887, 2888, 2889, 2890, 2891, 2892, 2893, 2894, 2895, 2896, 2897, 2898, 2899, 2900, 2901, 2902, 2903, 2904, 2905, 2906, 2907, 2908, 2909, 2910, 2911, 2912, 2913, 2914, 2915, 2916, 2917, 2918, 2919, 2920, 2921, 2922, 2923, 2924, 2925, 2926, 2927, 2928, 2929, 2930, 2931, 2932, 2933, 2934, 2935, 2936, 2937, 2938, 2939, 2940, 2941, 2942, 2943, 2944, 2945, 2946, 2947, 2948, 2949, 2950, 2951, 2952, 2953, 2954, 2955, 2956, 2957, 2958, 2959, 2960, 2961, 2962, 2963, 2964, 2965, 2966, 2967, 2968, 2969, 2970, 2971, 2972, 2973, 2974, 2975, 2976, 2977, 2978, 2979, 2980, 2981, 2982, 2983, 2984, 2985, 2986, 2987, 2988, 2989, 2990, 2991, 2992, 2993, 2994, 2995, 2996, 2997, 2998, 2999, 3000, 3001, 3002, 3003, 3004, 3005, 3006, 3007, 3008, 3009, 3010, 3011, 3012, 3013, 3014, 3015, 3016, 3017, 3018, 3019, 3020, 3021, 3022, 3023, 3024, 3025, 3026, 3027, 3028, 3029, 3030, 3031, 3032, 3033, 3034, 3035, 3036, 3037, 3038, 3039, 3040, 3041, 3042, 3043, 3044, 3045, 3046, 3047, 3048, 3049, 3050, 3051, 3052, 3053, 3054, 3055, 3056, 3057, 3058, 3059, 3060, 3061, 3062, 3063, 3064, 3065, 3066, 3067, 3068, 3069, 3070, 3071, 3072, 3073, 3074, 3075, 3076, 3077, 3078, 3079, 3080, 3081, 3082, 3083, 3084, 3085, 3086, 3087, 3088, 3089, 3090, 3091, 3092, 3093, 3094, 3095, 3096, 3097, 3098, 3099, 3100, 3101, 3102, 3103, 3104, 3105, 3106, 3107, 3108, 3109, 3110, 3111, 3112, 3113, 3114, 3115, 3116, 3117, 3118, 3119, 3120, 3121, 3122, 3123, 3124, 3125, 3126, 3127, 3128, 3129, 3130, 3131, 3132, 3133, 3134, 3135, 3136, 3137, 3138, 3139, 3140, 3141, 3142, 3143, 3144, 3145, 3146, 3147, 3148, 3149, 3150, 3151, 3152, 3153, 3154, 3155, 3156, 3157, 3158, 3159, 3160, 3161, 3162, 3163, 3164, 3165, 3166, 3167, 3168, 3169, 3170, 3171, 3172, 3173, 3174, 3175, 3176, 3177, 3178, 3179, 3180, 3181, 3182, 3183, 3184, 3185, 3186, 3187, 3188, 3189, 3190, 3191, 3192, 3193, 3194, 3195, 3196, 3197, 3198, 3199, 3200, 3201, 3202, 3203, 3204, 3205, 3206, 3207, 3208, 3209, 3210, 3211, 3212, 3213, 3214, 3215, 3216, 3217, 3218, 3219, 3220, 3221, 3222, 3223, 3224, 3225, 3226, 3227, 3228, 3229, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3265, 3266, 3267, 3268, 3269, 3270, 3271, 3272, 3273, 3274, 3275, 3276, 3277, 3278, 3279, 3280, 3281, 3282, 3283, 3284, 3285, 3286, 3287, 3288, 3289, 3290, 3291, 3292, 3293, 3294, 3295, 3296, 3297, 3298, 3299, 3300, 3301, 3302, 3303, 3304, 3305, 3306, 3307, 3308, 3309, 3310, 3311, 3312, 3313, 3314, 3315, 3316, 3317, 3318, 3319, 3320, 3321, 3322, 3323, 3324, 3325, 3326, 3327, 3328, 3329, 3330, 3331, 3332, 3333, 3334, 3335, 3336, 3337, 3338, 3339, 3340, 3341, 3342, 3343, 3344, 3345, 3346, 3347, 3348, 3349, 3350, 3351, 3352, 3353, 3354, 3355, 3356, 3357, 3358, 3359, 3360, 3361, 3362, 3363, 3364, 3365, 3366, 3367, 3368, 3369, 3370, 3371, 3372, 3373, 3374, 3375, 3376, 3377, 3378, 3379, 3380, 3381, 3382, 3383, 3384, 3385, 3386, 3387, 3388, 3389, 3390, 3391, 3392, 3393, 3394, 3395, 3396, 3397, 3398, 3399, 3400, 3401, 3402, 3403, 3404, 3405, 3406, 3407, 3408, 3409, 3410, 3411, 3412, 3413, 3414, 3415, 3416, 3417, 3418, 3419, 3420, 3421, 3422, 3423, 3424, 3425, 3426, 3427, 3428, 3429, 3430, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3440, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 3448, 3449, 3450, 3451, 3452, 3453, 3454, 3455, 3456, 3457, 3458, 3459, 3460, 3461, 3462, 3463, 3464, 3465, 3466, 3467, 3468, 3469, 3470, 3471, 3472, 3473, 3474, 3475, 3476, 3477, 3478, 3479, 3480, 3481, 3482, 3483, 3484

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# AVIATION

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### More Premature Plans

**A**IRMAIL has been conservative in its comment on some of the plans that have been handled widely for the development of the Navy. The North Pole ventures were not feasible when viewed from the position that we occupy in trying to promote aeronautical progress. We prefer to support the large investment that has been made by the government in airships and their equipment as justified on the ground of national defense and their use as naval cruisers.

(1) The Shenandoah and 503 are given every possible consideration for their use in aerial observation and for the most efficient utilization of airships by the government.

The following Washington dispatch gives the sort of assurance that we think is premature and gives an impression of exaggerated need for government airships:

"The most ambitious plans ever projected for exploration of the hidden corners of the globe are under consideration for the fragile Shenandoah and her sister airships, the Blimp, it was learned today.

"Prior to these ambitious undertakings the navy will conduct its peacetime work secretly. Cruisers will be made across the United States to the Pacific coast, thence to Hawaii and the Panama Canal and the Central American republics and thence through the West Indies.

"Flights around the world by both airships, now traveling west and the other going east.

"Flights to South America to conduct friendly relations between the peoples of the North and South American republics and to gather a mass of geographic, geologic, astronomical and meteorologic data.

"Exploration in the arctic regions—wide unexplored territories between Alaska and the North Pole, which may reveal new continents and a 'hot' spot.

"Regular Government air mail service from New York to London."

While facilities, such as the mooring mast, have been placed haphazardly, and adequate landing accommodations are available, such ambitious plans can only serve to create an impression that the needs of those charged with our airship development are not centered in the same problems—that of developing whether or not airships have military or naval value commensurate with their cost.

### A Detailed Aircraft Budget

**T**HE fourth plank of the suggested National Air Policy, one of which Airservice is discussing officially every week with the War Department, is a detailed aircraft budget for all Government departments and an annual statement of all expenditures.

It is a preliminary opportunity that this part of the policy is up for discussion this week, so in this issue these agencies will be the first to make their views known. This is the first detailed statement of aircraft expenditures of the Army that has ever been made public. And

quite as important as the increasing proof it carries of the necessity of having such figures made public, for we frankly doubt whether the error of an aviation dollar would have more to public notice had Airservice not suggested these figures.

As will be noted, the detailed statements that it is suggested be given to the public are of two kinds: First, the budget, and second, how the budget is allowed to be spent. One is of little value without the other. The aerial activities of the government are scattered through too many departments and too many bureaus to permit of proper study unless they can be centered in advance of their adoption. This has not been possible heretofore.

Every effort will be made in the future to secure these detailed estimates as they are presented to Congress, so that they may be discussed while they are under consideration. Much duplication and unnecessary expenditures would probably be found if the aerial activities of all the departments could be placed side by side.

But more important than the budget figures would be a detailed accounting for money expended. It is absolutely difficult to give in detail how millions of dollars are to be spent. Furthermore, the public when on the high purposes of government officers and their integrity in making expenditures. But when appropriations have been spent, the public is entitled to know how the money was used and the facts which will indicate whether it was expended with the greatest return and results. This is the only way the public has of judging public servants.

By all the standards of business practice, as well as good public policy, a yearly accounting is fundamental.

### MacLaren Forced Out

**T**HAT Major Stuart MacLaren has been forced to abandon his fight around the world as a matter of course ought to all Americans. The attempt was made against inclement cold, there was little if any advance preparation, no stocks of spare were carried at frequent intervals along the route, no buoy placed in advance, no distressing to such spare parts as, even of all, the fight seems to have been properly planned and carefully planned. The more credit must therefore be given to the Major and his associates. They showed apparent British determination, showing themselves to be well equipped with all of the strength that was in them.

The aviators seemed to have been dogged by hard luck from the very beginning and were in much behind schedule that it is doubtful whether they would have gotten to the Atlantic before the storm of autumn would have made the crossing impossible.

Two of our own men have been found out of the race and we are sure that the American firm apparently more than any one the brave attempt which MacLaren has made and regret his ill luck.

# The Aeromarine Model EO Sport Flying Boat

By B. V. KORVIN-KROUKOVSKY

Engineer in Charge of Airplane Design, Aeromarine Plane and Motor Co.

The following description and data regarding the three-wheel sport flying boat recently built for Earl E. Osborn of Atlantic, Virginia, has been written in cooperation with P. H. Zimmerman, Chief Airplane Engineer of the Aeromarine Plane and Motor Co.

great majority of the present day boats are hopelessly deficient in this respect.

The project, covering the general layout of the machine to be constructed, was submitted to Mr. Osborn for approval on Jan. 26, 1933. The first test flights were conducted on



Three views of the new Aeromarine, model EO, sport flying boat, fitted with a 70-80 hp. Anzani engine.

Mr. Osborn wanted to have a modern flying boat to replace his old Aeromarine Model 84. The new boat was to be built around a smaller engine to be more economical in operation and less troublesome in maintenance, yet was to carry the same useful load and to have the same or better performance than the older boat. The question of the safety was to be given particular consideration in the layout of this type, if any more will be built, will be used often by amateur pilots with but little experience. In fact it was considered desirable to have the type of the most suitable for training, as well as for the sport use. A strong emphasis was laid on failure of the boat with and without the passengers, and with power on and off. It is a well known fact, that the

June 26, 1933. It was a very fortunate circumstance that not only was Mr. Osborn the pilot himself, but it was also very closely associated in part with the development of the Aeromarine Airways, and later followed the development of the Aeromarine Model AMC Flying boat, the first flying boat built in this country with an all metal hull. Thus, it is the type, if any more will be built, will be used often by amateur pilots with but little experience. In fact it was considered desirable to have the type of the most suitable for training, as well as for the sport use. A strong emphasis was laid on failure of the boat with and without the passengers, and with power on and off. It is a well known fact, that the

Providing the development of a small six-cylinder engine with more than three cylinders in this country, the six-cylinder

August 31, 1933

AVIATION

609

Airport Type 643 was chosen. The engine installation was designed, however, that any rated engine of about the same horsepower and weight can be readily fitted. At present time this allows the choice of Wright L-6, Miller 50 hp. and Curtiss, besides the Anzani mentioned before.

## Advantages of Tractor Type

A rather radical departure from ordinary flying boat practice is found in the adoption of the tractor propeller and, as a result of this, the location of the pilot and passengers just back under the upper wing. Several considerations prove the adoption of this device. The first one was the reduction of safety. Everybody who has flown a tractor machine is familiar with the ever present fear that anything will fall into the propeller and cause disaster. This anxiety would still more be felt in case of a sport machine, where the designer hardly can be expected to remove any danger to the occupant. Again, in case of a crash there is no danger for crew of being passed under the motor or arrested in the top of the hull. It could be a very serious accident to break the hull as far as the cockpit is located in this case. In any case free exit from the cockpit toward the tail will be always available and can be enlarged, but not closed, by the crank.

When the boat is under development of the machine, as well as of the art of flying rendered the cranks rather unnecessary and that the designer should think more about the safety of the cranks than about safety after the crash. The tractor propeller and the forward location of the motor with some parts from the point of view as well. Were there any leaks in the gasoline system, the gasoline cannot get to the exhaust manifold and catch fire, as it almost always could in case of the motor with radial engine. With an inverted engine the motor is considerably better in all these respects than in case of the motor. The increased cooling helps to give greater reliability of the power plant. All these reasons, in our case, are well recognized in case of the lead machine, but as a matter of routine are still disputed for the flying boats.

Yet, however important, safety was not the only consideration that led to the adoption of the tractor propeller. The location of the pilot and passengers under the center of gravity of the machine makes for good balance and good conditions of the landing. There is no need here for shifting and long every time one wants to take an extra passenger. The tractor propeller gives the passenger a direct view of the machine from in case of the motor. This feature, usually objected in the land machine, is available in the case of flying boats, as it allows equally good balance to be obtained with the power on and off.

## Aeromarine Practice Followed

Apart from the adoption of the tractor propeller and very important changes in wings, the type of craft follows the modern Aeromarine practice. The hull has a large square fuselage, and a high of aluminum alloy sheets and stamped stringers. In general construction it resembles the predecessor, the Aeromarine Model AMC Flying boat, launched last year. The wings, of metal and fabric construction, are arranged in the form of a single bay between with large upper and small lower surfaces. The engine and cowling and all tanks with all the accessories, are carried in the aluminum alloy nacelle supported in the struts above the hull. These struts rest on the upper surface for the upper wing panels, which are hinged on the top of it. All cowling, interplane and tail struts are made of streamline steel tubing, then dunnep away with wood (balsa). Long and narrow ailerons are fitted to the upper wing, where they are well protected from the seas.

The specifications of the Aeromarine Model EO Sport Flying Boat are as follows:

Time	Tractor engine, hp	Drive
Power	1000	1000
Weight	1000	1000
Price	1000	1000
Speed	1000	1000
Altitude	1000	1000
Range	1000	1000
Take-off	1000	1000
Landing	1000	1000
Price	1000	1000
Weight	1000	1000
Power	1000	1000
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Landing	1000	1000
Price	1000	1000
Weight	1000	1000
Power	1000	1000
Time	1000	1000
Altitude	1000	1000
Range	1	

Four bulkheads on the top and bottom of the nacelle afford movement around in these important accessories.

The power plant is mounted about gasoline piping under the nacelle connects the subductor with the gasoline tanks. The rods under the tanks can be reached in flight from the pilot's cockpit. The oil pump (pulsator) is mounted under the nacelle very close to the oil pump, but outside the pilot. The pulsator is mounted on the side of the nacelle during flight, and the pulsator after a few days of long the pulsator and the simplicity of all these components are expected to improve materially the reliability of the power plant. It is well known that more forced landing occur, due to the trouble in the installation, than due to the failure of the engine proper.

There is no quick advance in the Avian magnetron, and the throttle and the ignition switch and wiring are the only major controls needed. The lever mounted on the instrument board is controlled by the lever of the subductor from the throttle control. The lever from the subductor is loaded by means of a steel spring made the throttle lever stay in any position on the graduated scale. The accuracy is such that only the lever handle and the great spring bearing proper through the instrument board, the control, wire and the starboard of the same are hidden back of it.

### Design of the Hull

The lines of the hull were drawn to obtain good aerodynamics and take off and easy landing. The seaworthiness developed previously as the means of the necessary buoyancy and stability of that was provided by the hull. The hull was designed on the rounded lines of the model AMC hull with slight changes that were found in the light of experience advantages. The hull was designed to be as simple as possible, but sharper, the angle of the bottom on each side of the hull with the horizontal is 15 deg at the step and 25 deg half way from the step to the bow. The bottom degrees angle is curved smoothly from the step to the stern. The straight lines of the hull and the clear in side elevation are carried further for work, slightly over half way from the step to the bow. The tail portion of the hull has slight upward sweep to bring the tail surface further from the water and to develop the tail leeward. The curve of the rear half starts at the step at an angle of 8 deg to the front bottom.

The large reserve buoyancy and the upward sweep of the hull bottom result in rather short waterline, and in a suspension in water without waterline on the water. It appears that the maximum turning radius is having a short oval to the span of the machine. The slight shoulder during the turn is found to produce much reaction on the skids. V bottom, that the hull makes itself toward the center of the turn, rather than turns the outward wing tip first, as in the usual case with the flying boat.

The value of the skids V bottom in shortening the landing stroke is hardly disputed by anybody. However many people still hold the opinion that V bottom is detrimental to the take off and the landing. This opinion is based on European Continental boats. The experience of the American coast to indicate that the sharper V bottom is advantageous, if anything, and was most successful boats from the take-off point of view has been known the sharper V bottom. The same fault of the V bottom, namely, throwing of the solid water and spray high up on the sides of the hull, seems to be entirely cured by having sharper V at the bow and flatter one at the stern. The observation of the take-off test just showed that the water hardly ever rose above 25 or 30 in on the sides, and the lower wing, however, low located, never gets the solid water and left little spray.

### Structural Details of Hull

Structurally the hull is built up of 15 alloy sheets and wrapped shapes. The framework consists of a number of angles and flat and all members, as opened up to give support to the sheet curved covering riveted to it. The stiffeners and the frames in the cockpit are of the same U-shaped section, while the frames in the undisturbed compartment are made of S sections. Four bulkheads divide the hull

into four water-tight compartments, not counting the cockpit. Aluminum alloy tubes are installed for the passage in the control wires through these compartments without affecting their watertightness. The seats are built in the hull properly, and allow the pilot and two passengers to sit continuously. The pilot's seat is mounted on front of the passenger's and particular care was exercised in securing the seats and the controls so as to prevent them from being interfered with by the passengers.

A watertight tube is provided across the hull just in front of the step for the wheel axle to pass through. The attachment of the wheel greatly facilitates the handling of the boat on shore and prevents the damage often done as a result of the landing tracks. For the test flights 2 men with the Ford car brought the machine out of the hangar some 600 ft from the shore, braced the boat and took it back into the hangar after the flight. This was done on sandy beach without runway and no low tide.

The test flights, which commenced on June 28, 1933, immediately demonstrated the perfect balance of the boat not only in normal flight, but during take-off and in the take off. The boat was flown with the pilot and the fuel in the only load, with pilot and a passenger and with two passengers, and the balance was found satisfactory in all cases. Considerable enough the take-off and the flying qualities seemed to be but little affected by the amount of the load carried. In all cases the boat was on step in 4 to 5 sec. after the opening of the throttle, and was off from 15 sec. with lighter load in 20 sec. with the same load. Rate of climb was practically the same, and the motor did not exceed 1300 r.p.m. at the maximum speed, which corresponds to 73.5 mi/hr. according to the power curve supplied by the motor manufacturers. The high speed determined by our experimental tests on the skids seems to be 73.5 mi/hr. The speed at maximum throttle setting was found to be 60.5 mi/hr. with the 10-horsepower steering 1810 r.p.m. These tests were made with two people aboard and with other loads in load under "Load Carrying Capacity" in the specifications given above. As the motor is fitted with the exhaust pipe extending above the wing, it flying in low altitude setting was consequently very light and was novel and delightful experience. The test flights are still in progress at the time of writing this description, and no data regarding the climb are yet available.

The full description of the machine was carried before by the author in "Aviation" in the result of his testing land and water experience.



France honors U. S. World Flier at LeMans. Left, Lord Lovell South on upper step to left of M. Laurent Eynat. Under Sign of State for Aviation, Lord Lovell South, center, and Lord Kew Nelson, extreme right. Not in British Army typical "shells".

## A \$6,000,000 Error in Air Service Costs

Correction Made by Assistant Secretary of War Davis in Letter to AVIATION

In the issue of AVIATION for April 28, 1934, we printed the following, which contains a table given by Gen. Mason A. Palmer to the Appropriations Committee:

"For the Army Air Service last, on page 993 of the AVIATION will be found the following figures:

COST OF ARMY AIR SERVICE, FISCAL YEARS 1929 TO 1934	
	1929
For operations	\$12,000,000
For maintenance	\$12,000,000
For construction	\$12,000,000
For administration	\$12,000,000
For other	\$12,000,000
Total	\$60,000,000

The above table does not include the cost of any of the Liberty engines, the D111's, or other material, that had been bought out of war time funds. As an estimate, they still reach \$1,000,000 Liberty engine on hand out of war stocks, which is not a good estimate.

An error was made of Secretary Weeks for a statement of the complete cost. He replied that all the figures that were available were shown there, but that detailed figures would be sent AVIATION at a later date.

These figures have been received from Assistant Secretary of War Dwight F. Davis, with the following notation:

COST OF ARMY AIR SERVICE FOR FISCAL YEARS 1929 TO 1934	
	1929
For operations	\$12,000,000
For maintenance	\$12,000,000
For construction	\$12,000,000
For administration	\$12,000,000
For other	\$12,000,000
Total	\$60,000,000

COST OF AIR SERVICE—FISCAL YEARS 1929 TO 1934	
	1929
For operations	\$12,000,000
For maintenance	\$12,000,000
For construction	\$12,000,000
For administration	\$12,000,000
For other	\$12,000,000
Total	\$60,000,000

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For construction	\$12,000,000
For administration	\$12,000,000
For other	\$12,000,000
Total	\$60,000,000

The data contained in communications of June 14 was the best estimate at the time, but should now be replaced by the later and more accurate data for the same year contained below.

The figures sent for the year 1933, as well as from the tables below, are \$10,000,000 for 1933, and \$10,000,000 for 1934, as given in Congress, and the revised figures.

This comes to \$10,000,000 and \$10,000,000, which is \$10,000,000 more than the figures given above, and \$10,000,000 more than the figures given above.

Of greater importance are the tables sent with the letter and printed below. It is the first time that the public has been given the costs of the Army Air Service in tabular form. In fact, they have not been available in any form, so far as we know, up to this time.

The first table gives the cost of the Army Air Service for the fiscal years 1929-1934 inclusive. It will be seen that the cost of the Army Air Service for the fiscal year 1934 is \$10,000,000, whereas the figure given in the AVIATION for 1934 is \$10,000,000, which is \$10,000,000 more than the figure given above.

Almost every other date in the 1933 figures has been revised. If these were for the fiscal year 1933, not closed, would be

















# The Aircraft Service Directory

WHERE TO PROCURE EQUIPMENT AND SERVICES

## FLIGHT INDICATOR

**PIONEER INSTRUMENT COMPANY**  
MAIN OFFICE AND FACTORY: BRIDGEVIEW, NEW YORK  
WASHINGTON, ST. LOUIS, PHOENIX, SAN FRANCISCO, LOS ANGELES, CHICAGO, ST. PAUL, MINN., DETROIT, MICH.

### JULY 1909 — 15 YEARS AGO

Those who first saw the flight indicator in the flight instructor's hand, have seen the flight indicator in the flight instructor's hand. The flight indicator is the only instrument in the world which is so simple and so accurate. It is the only instrument in the world which is so simple and so accurate. It is the only instrument in the world which is so simple and so accurate.

**Hamilton Aero Mfg. Co., Milwaukee, Wis.**

## PETREL MODEL FIVE

Super Performance in the 3 Seater Class.  
—Capable on Landings in Just Two Strokes—  
—Can Land on Water Calm or Rough—  
Details in Model Five & Free glossy brochure on request.  
**HUFF DALAND AERO CORPORATION**  
GREENSBORO, N. C.

**VACUUM AIRCRAFT CO.**  
444 DES PLAINES AVE., FOREST PARK, ILL.  
Price list for various models of vacuum aircraft, including the Model 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800, 850, 900, 950, 1000, 1050, 1100, 1150, 1200, 1250, 1300, 1350, 1400, 1450, 1500, 1550, 1600, 1650, 1700, 1750, 1800, 1850, 1900, 1950, 2000, 2050, 2100, 2150, 2200, 2250, 2300, 2350, 2400, 2450, 2500, 2550, 2600, 2650, 2700, 2750, 2800, 2850, 2900, 2950, 3000, 3050, 3100, 3150, 3200, 3250, 3300, 3350, 3400, 3450, 3500, 3550, 3600, 3650, 3700, 3750, 3800, 3850, 3900, 3950, 4000, 4050, 4100, 4150, 4200, 4250, 4300, 4350, 4400, 4450, 4500, 4550, 4600, 4650, 4700, 4750, 4800, 4850, 4900, 4950, 5000, 5050, 5100, 5150, 5200, 5250, 5300, 5350, 5400, 5450, 5500, 5550, 5600, 5650, 5700, 5750, 5800, 5850, 5900, 5950, 6000, 6050, 6100, 6150, 6200, 6250, 6300, 6350, 6400, 6450, 6500, 6550, 6600, 6650, 6700, 6750, 6800, 6850, 6900, 6950, 7000, 7050, 7100, 7150, 7200, 7250, 7300, 7350, 7400, 7450, 7500, 7550, 7600, 7650, 7700, 7750, 7800, 7850, 7900, 7950, 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22550, 22600, 22650, 22700, 22750, 22800, 22850, 22900, 22950, 23000, 23050, 23100, 23150, 23200, 23250, 23300, 23350, 23400, 23450, 23500, 23550, 23600, 23650, 23700, 23750, 23800, 23850, 23900, 23950, 24000, 24050, 24100, 24150, 24200, 24250, 24300, 24350, 24400, 24450, 24500, 24550, 24600, 24650, 24700, 24750, 24800, 24850, 24900, 24950, 25000, 25050, 25100, 25150, 25200, 25250, 25300, 25350, 25400, 25450, 25500, 25550, 25600, 25650, 25700, 25750, 25800, 25850, 25900, 25950, 26000, 26050, 26100, 26150, 26200, 26250, 26300, 26350, 26400, 26450, 26500, 26550, 26600, 26650, 26700, 26750, 26800, 26850, 26900, 26950, 27000, 27050, 27100, 27150, 27200, 27250, 27300, 27350, 27400, 27450, 27500, 27550, 27600, 27650, 27700, 27750, 27800, 27850, 27900, 27950, 28000, 28050, 28100, 28150, 28200, 28250, 28300, 28350, 28400, 28450, 28500, 28550, 28600, 28650, 28700, 28750, 28800, 28850, 28900, 28950, 29000, 29050, 29100, 29150, 29200, 29250, 29300, 29350, 29400, 29450, 29500, 29550, 29600, 29650, 29700, 29750, 29800, 29850, 29900, 29950, 30000, 30050, 30100, 30150, 30200, 30250, 30300, 30350, 30400, 30450, 30500, 30550, 30600, 30650, 30700, 30750, 30800, 30850, 30900, 30950, 31000, 31050, 31100, 31150, 31200, 31250, 31300, 31350, 31400, 31450, 31500, 31550, 31600, 31650, 31700, 31750, 31800, 31850, 31900, 31950, 32000, 32050, 32100, 32150, 32200, 32250, 32300, 32350, 32400, 32450, 32500, 32550, 32600, 32650, 32700, 32750, 32800, 32850, 32900, 32950, 33000, 33050, 33100, 33150, 33200, 33250, 33300, 33350, 33400, 33450, 33500, 33550, 33600, 33650, 33700, 33750, 33800, 33850, 33900, 33950, 34000, 34050, 34100, 34150, 34200, 34250, 34300, 34350, 34400, 34450, 34500, 34550, 34600, 34650, 34700, 34750, 34800, 34850, 34900, 34950, 35000, 35050, 35100, 35150, 35200, 35250, 35300, 35350, 35400, 35450, 35500, 35550, 35600, 35650, 35700, 35750, 35800, 35850, 35900, 35950, 36000, 36050, 36100, 36150, 36200, 36250, 36300, 36350, 36400, 36450, 36500, 36550, 36600, 36650, 36700, 36750, 36800, 36850, 36900, 36950, 37000, 37050, 37100, 37150, 37200, 37250, 37300, 37350, 37400, 37450, 37500, 37550, 37600, 37650, 37700, 37750, 37800, 37850, 37900, 37950, 38000, 38050, 38100, 38150, 38200, 38250, 38300, 38350, 38400, 38450, 38500, 38550, 38600, 38650, 38700, 38750, 38800, 38850, 38900, 38950, 39000, 39050, 39100, 39150, 39200, 39250, 39300, 39350, 39400, 39450, 39500, 39550, 39600, 39650, 39700, 39750, 39800, 39850, 39900, 39950, 40000, 40050, 40100, 40150, 40200, 40250, 40300, 40350, 40400, 40450, 40500, 40550, 40600, 40650, 40700, 40750, 40800, 40850, 40900, 40950, 41000, 41050, 41100, 41150, 41200, 41250, 41300, 41350, 41400, 41450, 41500, 41550, 41600, 41650, 41700, 41750, 41800, 41850, 41900, 41950, 42000, 42050, 42100, 42150, 42200, 42250, 42300, 42350, 42400, 42450, 42500, 42550, 42600, 42650, 42700, 42750, 42800, 42850, 42900, 42950, 43000, 43050, 43100, 43150, 43200, 43250, 43300, 43350, 43400, 43450, 43500, 43550, 43600, 43650, 43700, 43750, 43800, 43850, 43900, 43950, 44000, 44050, 44100, 44150, 44200, 44250, 44300, 44350, 44400, 44450, 44500, 44550, 44600, 44650, 44700, 44750, 44800, 44850, 44900, 44950, 45000, 45050, 45100, 45150, 45200, 45250, 45300, 45350, 45400, 45450, 45500, 45550, 45600, 45650, 45700, 45750, 45800, 45850, 45900, 45950, 46000, 46050, 46100, 46150, 46200, 46250, 46300, 46350, 46400, 46450, 46500, 46550, 46600, 46650, 46700, 46750, 46800, 46850, 46900, 46950, 47000, 47050, 47100, 47150, 47200, 47250, 47300, 47350, 47400, 47450, 47500, 47550, 47600, 47650, 47700, 47750, 47800, 47850, 47900, 47950, 48000, 48050, 48100, 48150, 48200, 48250, 48300, 48350, 48400, 48450, 48500, 48550, 48600, 48650, 48700, 48750, 48800, 48850, 48900, 48950, 49000, 49050, 49100, 49150, 49200, 49250, 49300, 49350, 49400, 49450, 49500, 49550, 49600, 49650, 49700, 49750, 49800, 49850, 49900, 49950, 50000, 50050, 50100, 50150, 50200, 50250, 50300, 50350, 50400, 50450, 50500, 50550, 50600, 50650, 50700, 50750, 50800, 50850, 50900, 50950, 51000, 51050, 51100, 51150, 51200, 51250, 51300, 51350, 51400, 51450, 51500, 51550, 51600, 51650, 51700, 51750, 51800, 51850, 51900, 51950, 52000, 52050, 52100, 52150, 52200, 52250, 52300, 52350, 52400, 52450, 52500, 52550, 52600, 52650, 52700, 52750, 52800, 52850, 52900, 52950, 53000, 53050, 53100, 53150, 53200, 53250, 53300, 53350, 53400, 53450, 53500, 53550, 53600, 53650, 53700, 53750, 53800, 53850, 53900, 53950, 54000, 54050, 54100, 54150, 54200, 54250, 54300, 54350, 54400, 54450, 54500, 54550, 54600, 54650, 54700, 54750, 54800, 54850, 54900, 54950, 55000, 55050, 55100, 55150, 55200, 55250, 55300, 55350, 55400, 55450, 55500, 55550, 55600, 55650, 55700, 55750, 55800, 55850, 55900, 55950, 56000, 56050, 56100, 56150, 56200, 56250, 56300, 56350, 56400, 56450, 56500, 56550, 56600, 56650, 56700, 56750, 56800, 56850, 56900, 56950, 57000, 57050, 57100, 57150, 57200, 57250, 57300, 57350, 57400, 57450, 57500, 57550, 57600, 57650, 57700, 57750, 57800, 57850, 57900, 57950, 58000, 58050, 58100, 58150, 58200, 58250, 58300, 58350, 58400, 58450, 58500, 58550, 58600, 58650, 58700, 58750, 58800, 58850, 58900, 58950, 59000, 59050, 59100, 59150, 59200, 59250, 59300, 59350, 59400, 59450, 59500, 59550, 59600, 59650, 59700, 59750, 59800, 59850, 59900, 59950, 60000, 60050, 60100, 60150, 60200, 60250, 60300, 60350, 60400, 60450, 60500, 60550, 60600, 60650, 60700, 60750, 60800, 60850, 60900, 60950, 61000, 61050, 61100, 61150, 61200, 61250, 61300, 61350, 61400, 61450, 61500, 61550, 61600, 61650, 61700, 61750, 61800, 61850, 61900, 61950, 62000, 62050, 62100, 62150, 62200, 62250, 62300, 62350, 62400, 62450, 62500, 62550, 62600, 62650, 62700, 62750, 62800, 62850, 62900, 62950, 63000, 63050, 63100, 63150, 63200, 63250, 63300, 63350, 63400, 63450, 63500, 63550, 63600, 63650, 63700, 63750, 63800, 63850, 63900, 63950, 64000, 64050, 64100, 64150, 64200, 64250, 64300, 64350, 64400, 64450, 64500, 64550, 64600, 64650, 64700, 64750, 64800, 64850, 64900, 64950, 65000, 65050, 65100, 65150, 65200, 65250, 65300, 65350, 65400, 65450, 65500, 65550, 65600, 65650, 65700, 65750, 65800, 65850, 65900, 65950, 66000, 66050, 66100, 66150, 66200, 66250, 66300, 66350, 66400, 66450, 66500, 66550, 66600, 66650, 66700, 66750, 66800, 66850, 66900, 66950, 67000, 67050, 67100, 67150, 67200, 67250, 67300, 67350, 67400, 67450, 67500, 67550, 67600, 67650, 67700, 67750, 67800, 67850, 67900, 67950, 68000, 68050, 68100, 68150, 68200, 68250, 68300, 68350, 68400, 68450, 68500, 68550, 68600, 68650, 68700, 68750, 68800, 68850, 68900, 68950, 69000, 69050, 69100, 69150, 69200, 69250, 69300, 69350, 69400, 69450, 69500, 69550, 69600, 69650, 69700, 69750, 69800, 69850, 69900, 69950, 70000, 70050, 70100, 70150, 70200, 70250, 70300, 70350, 70400, 70450, 70500, 70550, 70600, 70650, 70700, 70750, 70800, 70850, 70900, 70950, 71000, 71050, 71100, 71150, 71200, 71250, 71300, 71350, 71400, 71450, 71500, 71550, 71600, 71650, 71700, 71750, 71800, 71850, 71900, 71950, 72000, 72050, 72100, 72150, 72200, 72250, 72300, 72350, 72400, 72450, 72500, 72550, 72600, 72650, 72700, 72750, 72800, 72850, 72900, 72950, 73000, 73050, 73100, 73150, 73200, 73250, 73300, 73350, 73400, 73450, 73500, 73550, 73600, 73650, 73700, 73750, 73800, 73850, 73900, 73950, 74000, 74050, 74100, 74150, 74200, 74250, 74300, 74350, 74400, 74450, 74500, 74550, 74600, 74650, 74700, 74750, 74800, 74850, 74900, 74950, 75000, 75050, 75100, 75150, 75200, 75250, 75300, 75350, 75400, 75450, 75500, 75550, 75600, 75650, 75700, 75750, 75800, 75850, 75900, 75950, 76000, 76050, 76100, 76150, 76200, 76250, 76300, 76350, 76400, 76450, 76500, 76550, 76600, 76650, 76700, 76750, 76800, 76850, 76900, 76950, 77000, 77050, 77100, 77150, 77200, 77250, 77300, 77350, 77400, 77450, 77500, 77550, 77600, 77650, 77700, 77750, 77800, 77850, 77900, 77950, 78000, 78050, 78100, 78150, 78200, 78250, 78300, 78350, 78400, 78450, 78500, 78550, 78600, 78650, 78700, 78750, 78800, 78850, 78900, 78950, 79000, 79050, 79100, 79150, 79200, 79250, 79300, 79350, 79400, 79450, 79500, 79550, 79600, 79650, 79700, 79750, 79800, 79850, 79900, 79950, 80000, 80050, 80100, 80150, 80200, 80250, 80300, 80350, 80400, 80450, 80500, 80550, 80600, 80650, 80700, 80750, 80800, 80850, 80900, 80950, 81000, 81050, 81100, 81150, 81200, 81250, 81300, 81350, 81400, 81450, 81500, 81550, 81600, 81650, 81700, 81750, 81800, 81850, 81900, 81950, 82000, 82050, 82100, 82150, 82200, 82250, 82300, 82350, 82400, 82450, 82500, 82550, 82600, 82650, 82700, 82750, 82800, 82850, 82900, 82950, 83000, 83050, 83100, 83150, 83200, 83250, 83300, 83350, 83400, 83450, 83500, 83550, 83600, 8365

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## INDEX TO ADVERTISERS

A	
Aircraft Service Directory	876
African Purchasing Syndicate	877
American Aircraft, Inc.	875
American Propeller & Mfg. Co.	878
C	
Chamberlain House Aircraft Corporation	888
Classified Advertising	879
Columbus Aircraft Corporation	880
Carlson Consolidated Company	886
Carlson Metropolitan Airplane Co., Inc.	884
E	
Erasmus Aircraft, Ltd.	889
G	
Gulf Coast Airline	898
H	
Hawthorn Aero Mfg. Co.	870
Herdon, Richard F.	871
Hartman, Harold Edwin	872
Had Island Aero Corp.	873
I	
Irishair, G. N.	899
J	
Johnson Motor Products Co.	874
Johnson Airplane & Supply Co.	875
K	
Kellett, Wallace Co., Inc.	881
L	
Laudlin, Bookkeepers	876
Laudlin Standard Aircraft Corporation	877
Leeming, Armstrong Engineering Corporation	878
Logan, Floyd J.	879
Lodgeson Aviation Co., Inc.	880
M	
Martin, The Sales Co., Co.	881
N	
Northrop Marine A.	882
O	
Oleynard Aircraft Works	883
P	
Parker Instrument Co.	884
R	
Reber, Matthew B.	885
Reichhold Flying House	886
T	
Tips & Smith	887
Tipton, Inc.	888
W	
Where to Fly	889
Wright Aircraft Corp.	890
Y	
Yakovlev Aircraft Group	891



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2071	Master meter, 2500 ft. pressure from 15000 ft	10.00
2072	Master meter, 2500 ft. pressure from 15000 ft	10.00
2073	Master meter, 2500 ft. pressure from 15000 ft	10.00
2074	Master meter, 2500 ft. pressure from 15000 ft	10.00
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2077	Master meter, 2500 ft. pressure from 15000 ft	10.00
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